Ann Mariam Thomas

annmariam@u.northwestern.edu | github.com/am-thomas | linkedin.com/in/annmariamthomas

SUMMARY: PhD Candidate in Earth and Planetary Sciences, with a strong research background and interest in computational geophysics and data science. 4+ years of experience in organizing STEM workshops, internship programs, and conferences.

EDUCATION

Northwestern University Exp: December 2025
PhD Program in Earth and Planetary Sciences, Focus: Computational Geophysics
Research: Machine Learning for Seismic Event Detection and Characterization in the Chicago Area
Relevant Coursework: Machine Learning; Digital Signal Processing; Time Series Analysis; Mathematical Inverse Methods; Global Tectonics; Seismology

Colby College Aug 2017 - May 2020
Bachelor of Arts in Physics, Summa Cum Laude
Minor in Environmental Studies

RELEVANT WORK EXPERIENCE

EarthScope Consortium May 2024 - Aug 2024
Education Data & Resources Intern
- Developed technical documentation for software and instrumentation used in geophysical experiments (seismic refraction and electrical resistivity).
- Prepared 10+ geophysics course materials and revised data-rich activities used in *Teach the Earth* (serc.carleton.edu/teachearth)
- Modified web content to increase accessibility for users with screen readers and color-blindness.

Colby College, Information Technology Services Oct 2017 - Mar 2020
IT Support Technician
- Diagnosed and resolved software issues in computers, projection systems, and printers on campus
- Provided technical assistance to college faculty and students in-person, by phone, and by email

RESEARCH EXPERIENCE

Northwestern University, Earth & Planetary Sciences Mar 2021 - Present
Graduate Researcher, Advisor: Dr. Suzan van der Lee
- Developed supervised and unsupervised machine learning models to detect local earthquakes and unique manmade signals (e.g. quarry blasts) in noisy seismic data in the Chicago area.
- Created a labeled dataset of ~1000 man-made seismic events (e.g. blasts, machinery operation)

- Developed a Python workflow for phase picking and locating earthquakes in Illinois. The workflow is currently being adapted for locating quakes within the Ugandan portion of the East African Rift.

Northwestern University, Earth & Planetary Sciences Fall 2024 - Present
Graduate Researcher, Advisor: Dr. Rosemary Bush
- Documented the lesson plans and learning objectives for a geoscience high school internship program (NU-Geopaths), to serve as a template for similar K-12 programs.
- Evaluated program surveys to measure the near-term impacts of NU-Geopaths. Designed longitudinal surveys to distribute to past participants and measure long-term program impacts.
- Preparing a submission to a peer-viewed journal, describing the design and impacts of NU-Geopaths

Northwestern University, Civil & Environmental Engineering Sep 2020 - Mar 2021
Graduate Researcher, Advisor: Dr. Alessandro Rotta Loria
- Initiated collaborations with Chicago businesses and installed 40+ temperature sensors in Chicago's Loop district to monitor its subsurface conditions.
- Conducted and published a comprehensive literature review on current methods and numerical modelling techniques to study subsurface urban heat islands.

Colby College, Physics & Astronomy Sep 2018 - May 2019
Undergraduate Researcher, Advisor: Dr. Elizabeth McGrath
- Performed a comparative data analysis on data from CANDELS, an astronomical survey of the distance universe. Compared the structural data of cataloged quiescent disk galaxies with that of star-forming galaxies to better understand the quenching process.

Colby College, Environmental Studies Program Sep 2017 - May 2018
Undergraduate Researcher, Advisor: Dr. Philip Nyhus
- Digitized natural and manmade objects using GIS in Botswana's Makgadikgadi-Nxai Pan region. Our research team collaborated with Round River Conservation Studies to discuss a potential removal of animal fences in the region.

TEACHING EXPERIENCE

Northwestern University, Teaching Assistant
EARTH202: Earth's Interior Winter 2024, Winter 2023
- EARTH361: Scientific Programming in Python Fall 2022
- NU-Geopaths (high school internship program) Summer 2022

Colby College, Teaching Assistant
- PH241: Modern Physics I Fall 2019
- PH145: Foundation of Electricity and Magnetism Spring 2019
- PH141: Foundations of Mechanics Fall 2018

PUBLICATIONS

A. Thomas, O. Ranadive, & S. van der Lee (2025). Characterizing Seismic Events in an Industrial Corridor of the Chicago Area. *Seismological Research Letters*. In Press.

A. Thomas, O. Ranadive, & S. van der Lee (2025). Detecting small earthquakes in the Chicago area. Expected submission to *Bulletin of the Seismological Society of America*: August 2025.

A. Rotta Loria, A. Thota, **A. Thomas**, N. Friedle, J. Lautenberg, & E. Song (2022). Subsurface heat island across the Chicago Loop district: analysis of localized drivers. Urban Climate 44, 101211 (2022). https://doi.org/10.1016/j.uclim.2022.101211

CONFERENCE PRESENTATIONS

A. Thomas, O. Ranadive, & S. van der Lee (2024). Characterizing Seismic Data in a Noisy Urban Environment. American Geophysical Union Fall Meeting.

A. Thomas, O. Ranadive, & S. van der Lee (2023). Towards Detecting Small, Local Earthquakes in Greater Chicago Using Single-station Data. American Geophysical Union Fall Meeting.

A. Thomas, O. Ranadive, & S. van der Lee (2023). Feature Engineering and Clustering for Single-Station Seismic Waveform Classification in an Urban Environment. Seismological Society of America Annual Meeting.

A. Thomas, T. Davis, B. Alonzo, H. Bausch, A. Burdick, S. Camilleri, P. Puleo, M. Selensky, C. Wan, S. Woods, & S. van der Lee (2022). NU-Geopaths: Engaging Mentees and Mentors in an Inclusive Internship Experience. American Geophysical Union Fall Meeting.

A. Thomas & E. Mulyukova (2022). Incorporating the Microphysics of Transient Viscosity to Model Postglacial Rebound. American Geophysical Union Fall Meeting.

A. Thomas, H. Zhang, & S. van der Lee (2021). Seismic event detection in suburban Chicago using a single broadband seismic station. American Geophysical Union Fall Meeting.

M. Flanagan, V. Tang, O. Ranadive, **A. Thomas**, & S. van der Lee (2021). Earthquake Detective: Citizen Scientists Use Eyes and Ears to Classify Small Seismic Events. American Geophysical Union Fall Meeting.

PROFESSIONAL SERVICE/COMMUNITY ENGAGEMENT

Workshop: Volcano & Rift Seismicity in the Northern Branches of The East African Rift System April - May 2024

Workshop Leader

- Designed and led a half-day workshop on Machine Learning: Theory and Applications in Solid Earth Geophysics. Workshop exercises are available on GitHub.

NU-Geopaths High School Internship Program Jun 2022 - Aug 2023

Organizing Committee Member and Mentor

- Organized programming and logistics, in collaboration with Chicago public school teachers, to implement an additional, volunteer-run internship year of NU-Geopaths after funding expired. Served as a mentor for two years, advising a high school student on a summer geophysics project.

Expanding Your Horizons (EYH) Chicago Mar 2021 - Mar 2023

2022 & 2023 Fundraising Co-Chair, 2021 Conference Volunteer

- Organized individual and corporate fundraisers for EYH Chicago: a workshop-based symposium for middle-school girls to engage with STEM leaders. Served as a day-of volunteer, assisting with conference photography and food distribution.

EvanSTEM Apr 2021 - May 2021

Mentor for the Climate Action Project

- Mentored a sixth-grade student through weekly, one-hour sessions, on their app-based project on air pollution

Colby Storytellers and the Alzheimers Association, Maine Chapter Oct 2019 - Nov 2019

Volunteer Scribe

- Recorded the life stories of a Waterville resident with early stages of Alzheimer's disease and created a short book to be shared with her and her loved ones.

Women in Physics, Colby College Jan 2018 - Mar 2020

Co-President (Sep 2018- May 2019) and Member

- Planned the all-campus STEMinist dinner, club social events, and travel details for the Conference for Undergraduate Women in Physics.

TRAINING/WORKSHOPS

Earth Educators Rendezvous July 2024
Relevant workshops: Improving the Sustainability of Data-rich Activities using the Community Contribution Tool, Guiding Students to Use Evidence to Support Their Scientific Reasoning

Northwestern University CoDex Workshop on Data Visualization April 2024

NU-Geopaths Mentorship Training Summer 2022, Summer 2023

Remote Online Sessions for Emerging Seismologists (ROSES) Summer 2021

AWARDS & HONORS

Marion Sloss Award for Outstanding Graduate Teaching Assistant, Northwestern University (2024)
COHEN Graduate Service Award, Northwestern University (2023)
CIERA Board of Visitors Graduate Fellowship (declined offer), Northwestern University (2023)
Inductee to Phi Beta Kappa (2020)
Outstanding Learning Assistant, American Association of Physics Teachers (2019)
William A. Rogers Prize in Physics and Astronomy, Colby College (2019)
Presidential Scholar, Colby College (2017)

TECHNICAL SKILLS

Programming Languages: Python, MATLAB, Interactive Data Language (IDL), LaTeX
Libraries: Scikit-learn, NumPy, SciPy, Matplotlib, Pandas, Seaborn, ObsPy, PyGMT, Seisbench
Analytics/tools: Git, QGIS, Google Earth, OPTUM G2
Design: Adobe Illustrator, Vectorworks

REFERENCES

Dr. Suzan van der Lee, Professor at Northwestern University (PhD advisor)
Dr. Beth Pratt-Sitaula, Engagement Program Manager at EarthScope Consortium